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STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING



DAN WYANT  
DIRECTOR

May 2, 2012

Mr. Samuel Borries  
United States Environmental Protection Agency  
Region 5  
77 West Jackson Boulevard (SE-5J)  
Chicago, Illinois 60604-3507



Dear Mr. Borries:

SUBJECT: Draft Former Plainwell Impoundment and Plainwell No. 2 Dam Area 2011 Bank Conditions Monitoring Report, Prepared on Behalf of Georgia-Pacific LLC, dated December 2011

The following comments were prepared by the Michigan Department of Environmental Quality (MDEQ) with regard to the Bank Conditions Monitoring Report for Federal and State Review prepared on behalf of Georgia-Pacific LLC, dated December 2011 (Report). The Report was prepared for the Kalamazoo River Study Group (respondents) in accordance with the Administrative Order by Consent, for Removal Action.

Global

1. There are calculation errors in Table 2 (and probably Table 5) for "Root Depth/Bank Height Value" and the "Root Density Value" which will impact the total score of the Bank Erosion Hazard Index (BEHI) for a given bank segment. Examples of these errors are included in the specific comments below.
2. The text in the report should make it clear that only bank stability is being assessed and the only tools used to evaluate bank stability are BEHI and bank profile surveys. River channel stability assessment is not a component of this report.

Specific

1. Page 1-5, Section 1.2.3, bullets: The text at the bottom of page 1-4 specifically states that eight events listed at the top of page 1-5 exceeded the two-year storm event flow at Comstock since the completion of the Plainwell Time Critical Removal Action (TCRA). The dates listed range from September 2008 to June 2011. There is a discrepancy between the text and the listed events, because the Plainwell TCRA was completed in June 2009 (based on the text in the construction completion report). As a result, reference to storms September

2008, Dec 2008/January 2009, February 2009, and March 2009 should be removed as they were before the completion of the TCRA.

2. Page 1-5, Section 1.2.3: The text states, "Banks and riparian habitats that remain stable after these storm events can be concluded to be stable." Future stability of a bank cannot be predicted by its performance in a limited number of events. The sentence should be removed as this report is only meant to monitor the bank conditions over the monitoring period, but cannot reliably predict future conditions.
3. Page 1-5, first paragraph: The definition or metrics of the term "stable" needs to be included in order to draw conclusions regarding the impact of the storm events on the bank and riparian habitats.
4. Page 2-2, Section 2.3, first paragraph, 5<sup>th</sup> and 6<sup>th</sup> sentences: The text states, "Therefore, the objective of bank monitoring activities is to evaluate the functionality of restored river banks towards the overall stability of the river system, its floodplain, and its associated riparian habitat." Stability of a river system, according to Rosgen, is the river's ability to transport stream flows and sediment of its watershed over time in such a way that the channel maintains its dimension, pattern, and profile without aggrading or degrading. Furthermore, bank profile data and BEHI ratings are not used only in determining river stability. The text should be changed to state, "Therefore, the objective of bank monitoring activities is to evaluate the functionality of restored river banks."
5. Page 2-2, Section 2.3, first paragraph, sentence: The text states, "Monitoring objectives do not focus on whether or not erosion is occurring, but on whether any erosion is jeopardizing the stability of the river system or its top-of-bank land uses. Lateral erosion associated with natural river processes that increase the interaction of the Kalamazoo River with its floodplain are considered acceptable. However, vertical erosion behind a bank or behind toe rock protection that could result in significant bank failure will be addressed through repairs, as needed." This statement does not accurately reflect conditions at the site. First of all, bank monitoring, for purposes of this report, does not attempt to assess the "stability of the river system." Additionally, lateral erosion associated with natural river processes is necessary to achieve a stable channel, but is not necessarily considered acceptable due to remaining contamination in the floodplain. Change text to read "Bank monitoring is focused on assessing the stability of the river banks only. Although a stable river channel was not achieved at the site, the

balance between lateral channel migration and the objective of maintaining stable river banks is being evaluated.”

6. Page 2-2, Section 2.3, 2<sup>nd</sup> paragraph, first sentence: Remove “The stability and acceptability” at the beginning of the sentence and replace with “The erosion susceptibility.”
7. Page 3-1, Section 3.1, 1<sup>st</sup> paragraph, 6<sup>th</sup> sentence: The text indicates eight storms were greater than the two-year event after completion of the TCRA. See Specific Comment 1 above, where the number of storms should only be four.
8. Page 4-1, Section 4: It is unclear if the BEHI measurements recorded in Table 2 were collected from the same location. In order to accurately evaluate BEHI ratings over time, measurements should be recorded in the exact locations from year to year, similar to the bank profile data. Please indicate whether BEHI measurements were recorded at identical locations for the various years.
9. Page 4-2, Section 4.1, last paragraph, second to last sentence: Remove the entire sentence starting with “In general....”
10. Page 4-3, Section 4.1, fourth sentence: BEHI alone cannot determine stability, only the susceptibility of a bank to erosion, and without a Near-Bank Stress (NBS) evaluation, conclusions may be misleading. This should be acknowledged within the report.
11. Page 4-3, Section 4.1.1:
  - a. The number of bank elevation measurements recorded during the 2011 survey appears to be less than those measured in 2009 and 2010 (based on breaks in slope for each year’s line in Figure 4 through Figure 11) at a majority of the profiles. Conclusions drawn regarding erosion or deposition between survey years should be made carefully. For example, T-1N states that there is possible sediment accumulation; however, it is unclear from the Figure whether that is real or if the surveyor did not measure the appropriate break in slope.
  - b. Bank survey data should be quantified and included in each of the 22 banks profiled, along with ranges of acceptable erosion rates (if applicable). Each bank profile conclusion was not verified, but based on the text 20 of the 22 banks are considered “stable.” Review of Figures 4 through 11 may support that at least 9 of the 22 banks are vertically and/or laterally eroding (compared to only 2 not labeled stable in the text). An

example of the stability discrepancy can be shown at T-3N, where the text understates the amount of erosion observed by saying "some toe erosion"; based on Figure 5, the amount of erosion between 2009 and 2011 is nearly 2 feet vertically and 10+ feet laterally into the floodplain. The bank is characterized as stable; however, there is a significant amount of erosion observed.

- c. There should be a summary sentence/paragraph stating the net amount of erosion or deposition that occurred with the Plainwell TCRA based on the bank profile data.
12. Page 6-2, Section 6.1.1: Text states, "It was acknowledged by the meeting attendees that the stream width was adjusting to create a stable planform and that this adjustment is acceptable as long as it does not affect the overall stability of the river channel." Text should be changed to read, "It was acknowledged by the meeting attendees that the objective of creating a stable river channel was not achieved by the Removal Action. Therefore, the stream dimensions will continue to adjust until a stable planform is achieved. This adjustment will continue to affect bank stability, to some degree, through time."
13. Page 6-4, Section 6.4, first paragraph: As discussed at previous site visits, another adaptive management approach that should be considered besides armoring is widening the channel and creating a reach that has a stable dimension, pattern, and profile as a reference condition in the same valley and stream type. This consideration should be incorporated into the report.
14. Page 7-1, Section 7: The MDEQ requests that the following is added to Task 1:
  - a) NBS evaluation; and b) complete cross section surveys (i.e., from top of left bank to top of right bank, including in-stream measurements) with elevations recorded at previous surveyed points at a minimum, and any new breaks in slope.
15. Page 7-1, Section 7: The MDEQ recognizes that the prediction of bank erosion rates developed by Rosgen is called the Bank Assessment for Non-point source Consequences of Sediment (BANCS) model. The model uses two bank erosion estimation tools: BEHI and NBS. BEHI ratings only consider erosion potential of the bank without consideration of energy distributions against a bank and, therefore, evaluating BEHI exclusive of NBS is of limited value. An evaluation of NBS must be conducted along with BEHI in order to fully understand the erosion potential of bank material. Based on relationships developed by Rosgen

between BEHI and NBS, a low BEHI rating does not necessarily correlate with low erosion. If the NBS is high, there may be an order of magnitude difference in erosion rate prediction. It is requested that NBS evaluation be added to the future monitoring.

16. The bank monitoring report should include an evaluation of all banks within the TCRA reach, not just the banks that were "restored" as part of the TCRA activities. Changes in dimension, pattern, and profile of the reach due to TCRA mass removal can impact areas that were not part of the TCRA and, therefore, those banks need to be evaluated for actual or potential erosion and discussed within this report.
17. Page 8-1, Rosgen reference: It is unclear whether the reference cited is for Rosgen's Applied River Morphology book (published in 1996) or his WARASS book published in 2006. This may be a discrepancy in the year or the title of the reference.
18. Table 2:
  - a. Add easting/northing for each area (A1 through O4) where BEHI was measured.
  - b. Instead of showing "=" for study bank height and bank full height, include the actual measurement recorded for each. These measurements are needed to understand how BEHI values were calculated for Root Depth/Study Bank Height.
  - c. **ERRORS IN CALCULATING BEHI:** The table identifies several fundamental errors when calculating BEHI ratings. Some may change both the total score and BEHI classification while others may only change the total score, but still be in the same BEHI range. Apparent flaws are in the "Root Depth/Bank Height Value" and the "Root Density Value" calculations; however, it is unknown whether other field measurements and/or assessments were done according to Rosgen principles.
    - i. Root Depth/Bank Height Value: The "Root Depth/Bank Height Value" is calculated by taking the root depth and dividing by the study bank height. An example of the error can be shown for Area H1, which has a study bank height of 12.9 feet and a root depth of 6 inches; therefore, the root depth to study bank height ratio is 0.03875 (0.5 feet/12.9 feet). Based on the BEHI rating

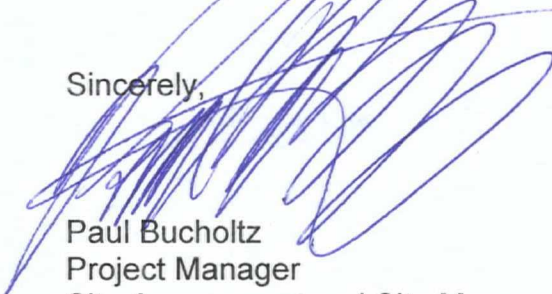
curve, a value of 9 should have been given instead of 5. This calculation error will change the "Root Depth/Bank Height Value" for all those locations in the table where a study bank height is given and, most likely, those with only an "=" as well.

- ii. Root Density Value: The "Weighted Root Density" is calculated by multiplying the Root Density assigned in the field (and included in Table 2) by the "Root Depth/Study Bank Height" ratio. The error in the table is that the "Root Density" was used to get a BEHI rating, instead of the "Weighted Root Density." For example, using H1 above, the root depth to bank height ratio was ~0.04. The assigned Root Density in the field was 50% or 0.50. To calculate a BEHI rating, multiply 0.5 by 0.04 to get 0.02 (or 2%); this value is used in the BEHI rating curve to yield a value of at least 9, not 5 as shown. This error will impact all Weight Root Density values and, therefore, all total BEHI scores.

19. Figure 12: The map should be updated to show where the exact BEHI measurements were recorded for each bank segment evaluated.

If you have any questions regarding these comments, please feel free to contact me at the number below. If in agreement with the MDEQ's assessment, please feel free to incorporate these suggestions into your comment review or directly forward to the respondents.

Sincerely,



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cc: Mr. Garry Griffith, Georgia-Pacific LLC  
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